For more information contact: Scott Breeding (573) 526-4325

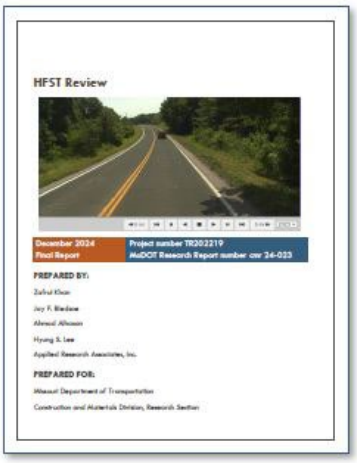
Research Summary

HFST Review

HFST is a widely accepted method to decrease roadway departure accidents by enhancing friction between the tire and pavement surface. MoDOT has implemented HFST in numerous locations throughout the state. This study reviewed the pavement conditions and crash statistics of these locations before and after the application of HFST to develop guidance or a set of recommendations that can be followed for the successful implementation of HFST at new locations.

From the literature review and focused survey, the most common distresses observed in the HFST are delamination, cracking, raveling, and surface wrinkling. Among the surveyed transportation agencies, only Florida and New Jersey have established criteria for selecting HFST sites based on existing pavement distresses.

After literature review and focused interview, pavement distress data were evaluated before and after the application of HFST to identify locations with early failure. Even at locations with higher reported distress after the application of HFST, few showed the failure of the HFST itself but rather the propagation of underlying distress through the HFST. From the crash data analysis, it was observed that there were 925 wet crashes on the 146 sections prior to HFST. This was reduced to 166 in the post-application. However, only 48 of the 146 sections had reduced crashes post-construction, indicating that the large number of wet crashes was concentrated on a relatively small number of sections with large numbers of crashes.



Based on the distress and crash data analysis of the HFST locations, this research provided the following guidance and recommendation:

1. Site selection for future HFST applications should start with the identification of possible locations based on observed crash data.
2. A preliminary safety analysis using appropriate safety performance function (SPF) should be performed to determine if the location is likely to benefit from the application of HFST. A benefit-cost analysis can also be performed to determine the effectiveness of the application.
3. Once a site is determined to be appropriate, it should be evaluated with respect to the existing pavement condition. For asphalt pavement, a minimum PASER rating of 7 should be used; while for concrete pavement, a minimum PASER rating of 8 should be used for consideration of application of HFST.
4. It is recommended to collect the ARAN images of the HFST locations, including the ones on-ramp locations.
5. It is also recommended that pavement friction data be collected at regular intervals to verify whether the HFST is providing adequate benefits even after the

observed distresses, which can help define the "failure" of HFST.

6. MoDOT may consider a study to develop or calibrate SPFs for different functional classes of pavements based on the local condition.
7. The proposed guidance on the application of HFST is not exhaustive; rather, it is meant to be revised and updated based on the feedback, suggestions, and engineering judgment of the district and field engineers.

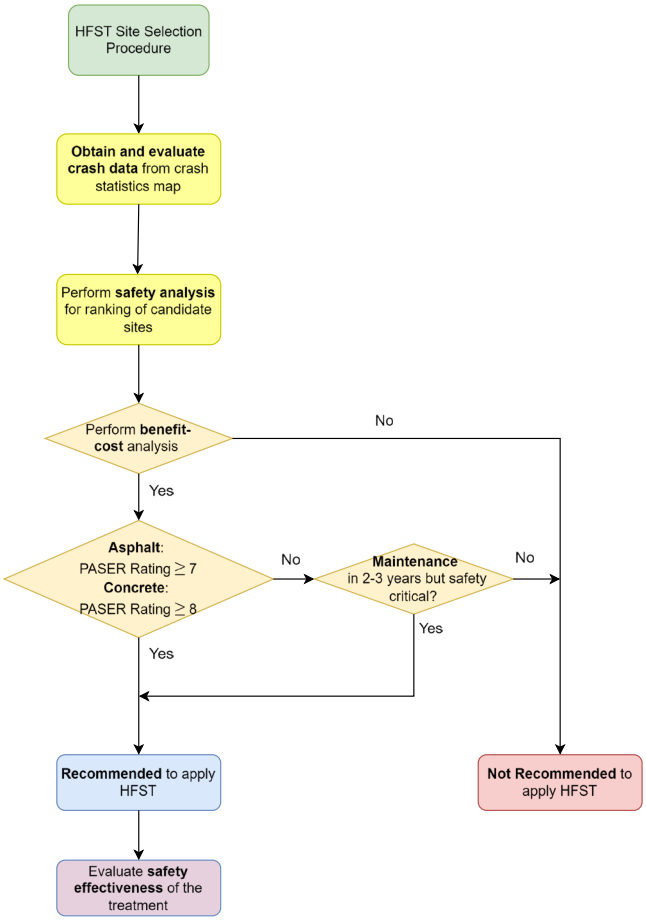


Figure 1: Flowchart for guidelines on HFST application.

Project Information

PROJECT NAME: TR202219—HFST Review

PROJECT START/END DATE: June 2023-December 2024

PROJECT COST: $199,943

LEAD CONTRACTOR: Applied Research Associates, Inc.

PRINCIPAL INVESTIGATOR: James Bledsoe and Ahmad Alhasan

REPORT NAME: HFST Review

REPORT NUMBER: cmr 24-023

REPORT DATE: December 2024

Project Manager

CONTACT INFORMATION:

Scott Breeding
Senior Research Analyst
Missouri Dept. of Transportation
1617 Missouri Blvd.
Jefferson City, MO 65109
(573) 526-4325
Scott.Breeding@modot.mo.gov